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EXAMINER

VALENTI, ANDREA M

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOHN VAN GEMERT, MARTINUS KERS, and
GERARDUS JOHANNES JOZEF MARIA MEEUWS

Appeal 2015-000170
Application 13/123,942¹
Technology Center 3600

Before LINDA E. HORNER, BRANDON J. WARNER, and
JASON W. MELVIN, *Administrative Patent Judges*.

MELVIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal arises under 35 U.S.C. § 134(a), from a final rejection of claims 1–6, 8, 10–12, and 14–20. Appellants’ representative presented arguments at an oral hearing on March 16, 2017. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ Appellants identify Plantlab Groep B.V. as the real party in interest. Appeal Br. 1.

BACKGROUND

The claims are directed to systems and methods for growing a plant in a conditioned environment. Claim 1, reproduced below, is illustrative:

1. A system for growing a plant in a conditioned environment, comprising:
 - a cultivation base adapted for receiving a culture substrate with a root system of the plant therein;
 - means for root temperature control adapted to impose a predetermined root temperature on a root system;
 - means for lighting adapted to expose leaves of the plant to actinic artificial light;
 - means for leaf heating adapted to impose on the leaf of the plant a leaf temperature varying from an ambient temperature; and
 - a control is provided between the means for leaf heating and the means for root temperature control which imposes a mutual dependence on the leaf temperature and the root temperature.

Appeal Br. 15 (Claims App.).

REJECTIONS

Appellants seek review of the following: claims 1–6, 8, 10–12, and 14–20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Wittlin (U.S. Pat. No. 5,009,029, iss. Apr. 23, 1991), Fang (U.S. Pat. Pub. No. 2001/0047618 A1, pub. Dec. 6, 2001), Horaguchi (U.S. Pat. No. 5,269,093, iss. Dec. 14, 1993), Morag (U.S. Pat. Pub. No. 2007/0260400 A1, pub. Nov.

8, 2007), and Taylor (A.O. Taylor and J. A. Rowley, *Plants under Climatic Stress*, 47 Plant Physiol. 713, (1971)). Final Act. 4–7; Adv. Act. 2.²

DISCUSSION

Claim construction

The Examiner construes several limitations as means-plus-function limitations pursuant to 35 U.S.C. § 112, sixth paragraph. Although the Examiner does not elaborate on each required function, the Examiner provides the corresponding structures recited in the Specification:

Limitation	Corresponding structure
“means for root temperature control”	a closed conduit system receiving therein liquid flow
“means for lighting”	set of light emitting diodes (LEDs)
“means for leaf heating”	infrared radiation element #30

Final Act. 2. Appellants do not challenge these constructions in their briefs.

Obviousness

Appellants address all claims as a group. *See* Appeal Br. 4–13. Accordingly, we select claim 1 as representative and all other claims stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that Wittlin teaches the claimed cultivation base and means for root temperature control. Final Act. 4. Although Wittlin

² The rejection of claim 21 under 35 U.S.C. § 112, fourth paragraph (Final Act. 3) was rendered moot by Appellants cancelling that claim. *See* Appeal Br. 4 (noting that the Advisory Action of February 24, 2014, entered the amendment cancelling claim 21).

teaches artificial lighting, it does not teach LEDs; the Examiner relies on Fang as teaching LEDs and finds that a person of ordinary skill in the art had reason to use the LEDs of Fang “to achieve optimal light quality for either energy savings and/or better growth rate of plants as taught by Wittlin.”

Final Act. 5.

Regarding the means for leaf heating, the Examiner finds that Horaguchi teaches the claimed structure—infrared radiation elements—and that a person of skill had reason to add those elements to Wittlin’s growing apparatus “for providing photomorphogenesis.” Final Act. 5.

Regarding the claimed control, the Examiner finds that “Morag teaches a computerized crop growing management system that provides control between root temperature and leaf temperature” (citing Morag ¶ 89) and that Taylor teaches “the mutual dependence of leaf temperature and root temperature” (citing Taylor, 715–16). Final Act. 6. The Examiner further finds that a person of ordinary skill in the art had reason to “to modify the teachings of Wittlin with the general knowledge of Morag and Taylor at the time of the invention for automated management and controlled growth.” *Id.* at 6. In the Answer, the Examiner further finds that using teachings from Morag and Taylor would allow “optimiz[ing] photosynthesis and plant growth.” Ans. 7.

Horaguchi

Appellants argue that “Horaguchi . . . do[es] not discuss the relevance of an ambient temperature in relation to a leaf temperature for improving plant growth, and hence fails to disclose means for imposing a leaf temperature on the leaves varying from an ambient temperature.” Appeal Br. 9. We do not agree that Horaguchi must discuss the relevance of

ambient temperature in order for its teaching of infrared radiators to teach the claimed structure. We see no error in the Examiner's finding that "Horaguchi teaches wavelengths in the infrared range . . . and satisfies the claim requirement of the leaf heating means according to the invention." Ans. 5–6; *accord id.* at 6 ("The light of Horaguchi at the taught wavelength will produce heat i.e. impose a temperature that varies from the ambient temperature.").

During the hearing, counsel for Appellants pointed to Horaguchi's teaching of a wind tunnel with an electric fan for air circulation. *See* Horaguchi 2:25–27. According to Appellants, because Horaguchi includes that wind-tunnel arrangement, Horaguchi's infrared radiators are not "adapted to impose on the leaf of the plant a leaf temperature varying from an ambient temperature" as claimed. Transcript of March 16, 2017, 7:8–9:15. In our view, however, Horaguchi's wind tunnel supports the Examiner's findings: using a wind tunnel to control the ambient temperature is consistent with the finding that Horaguchi's infrared radiators impose a leaf temperature that varies from the ambient temperature.

Appellants argue that there "is no motivation in Horaguchi . . . to provide means to impose a leaf temperature on the leaves of the plant varying from an ambient temperature" and that, therefore, the skilled practitioner "would have no reason to modify the teaching of Wittlin in view of Horaguchi." Appeal Br. 9–10; *see also* Reply Br. 3–4 ("The effect on plant growth by a possible heat development in the leaves as a result of such irradiation is not disclosed in Horaguchi."). But the Examiner explains that a person of ordinary skill in the art would have been motivated by Horaguchi's teaching to use the infrared radiators "for providing

photomorphogenesis.” Final Act. 5; Ans. 6 (both citing Horaguchi 1:46–48). The Examiner’s rejection relies on a reason for the modification with rational underpinning.³ *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Indeed, accepting Appellants’ position would amount to ignoring the Supreme Court’s instruction that “neither the particular motivation nor the avowed purpose of the patentee controls.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007). Thus, Appellants’ arguments regarding Horaguchi do not apprise us of error in the rejection.

Morag and Taylor

Appellants argue that the Examiner incorrectly concludes that it would have been obvious to use the claimed control, which “imposes mutual dependence on the leaf temperature and the root temperature.” Appeal Br. 10–12. According to Appellants, Taylor at most teaches “that the root temperature and the leaf temperature both play a role in photosynthesis” but not “that controlling the root temperature and leaf temperature of the plant in mutual dependence results in an improved growth of the plant.” *Id.* at 11. We, however, agree with the Examiner that Taylor teaches “leaf temperature and root temperature have a mutual dependence.” *See* Ans. 7.

In a section titled “Root Temperature and Leaf Temperature,” Taylor describes a set of experiments measuring photosynthesis activity, in which root and leaf temperature were varied in two different plants by reducing them from 25°C to 10°C. Taylor 715–16. As Taylor’s Table IV shows, the

³ The Examiner has not supported the conclusion that using Horaguchi’s leaf-heating means would have been “merely the simple substitution of one known element for another to obtain predictable results.” Final Act. 5. But that deficiency does not undermine the Examiner’s other reasoning.

experiments included changing the root and leaf temperature together and also changing just one or the other. *Id.* at 716. We agree with the Examiner’s finding that Taylor teaches “mutual dependence of leaf temperature and root temperature.” Final Act. 6.

Morag teaches that “a climate controller in a greenhouse may be connected to one or more operational sensors,” including those measuring “the roots’ temperature” and “leaf temperature,” and that “controllers known in the prior art run the control loop in accordance with data received from the operational sensors.” Morag ¶ 89. We agree with the Examiner’s finding that Morag teaches “using a computerized system to analy[ze] and control the environmental parameters.” Ans. 7.

We note the broad scope of the claim term “imposes a mutual dependence.” *See* Appeal Br. 15 (Claims App.). Neither the claims nor the Specification provides a narrowing statement regarding how a controller must impose mutual dependence. *See* Tr. 11:1–12:8, 14:1–11. The Specification gives an example that “[i]n for instance a normal growth trajectory the leaf temperature will thus follow, optionally in directly proportional manner, a change in root temperature.” Spec. 5:13–15. We conclude that the broadest reasonable construction of the term includes any control where one parameter depends on the other in some fashion. When considering Morag’s teachings of an environmental controller together with Taylor’s teachings regarding the interdependence of root and leaf temperatures, we agree with the Examiner’s findings that a person of skill had reason to configure the controller taught by Morag with the claimed

mutual dependence of root and leaf temperature as taught by Taylor in order “to optimize photosynthesis and plant growth.”⁴ Ans. 7.

Thus, Appellants’ arguments regarding Morag and Taylor do not apprise us of error in the rejection.

Accordingly, we sustain the Examiner’s rejection of claims 1–6, 8, 10–12, and 14–20.

DECISION

For the above reasons, the Examiner’s rejection of claims 1–6, 8, 10–12, and 14–20 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

⁴ The Examiner has not supported the conclusion that “[t]he modification is merely ‘obvious to try’ choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.” Final Act. 6; *accord* Ans. 7. But that deficiency does not undermine the Examiner’s other reasoning.